

ANTISEPTIC SURGICAL PRECAUTIONS OF SPECIAL IMPORTANCE TO THE GENERAL PRACTITIONER.¹

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IN contemplating an operation of any importance, it is the duty of the general practitioner or country surgeon to take into consideration the medium, the surroundings, in which it is going to be performed and to do his best in the way of getting them into an aseptic condition. In case of a somewhat large operation in a private house, first a few questions should be asked in regard to the hygienic antecedents of the house in general, and of the different rooms in particular. Many times nothing useful might be elicited, but if it were learned that in the particular room, selected for the operation, a woman had died some time previous from puerperal fever or a child had been sick with scarlatina, or somebody had been down with erysipelas or diphtheria, then care taken with regard to a point so commonly overlooked would be a matter of self-gratulation.

When no especially unfavorable information is received, the safest operating room in the average farm, or private house, is the parlor, or amongst people a little better situated, a spare bed-room.

Now, how should such a room be properly prepared for an operation—for instance, an abdominal section? From the parlor, the carpet and the upholstered furniture should be removed, and the walls and ceiling should be gone over with a strong duster or a soft broom—if they cannot be kalsomined or papered. The floor, doors and windows should be washed with soap and brush. After that the windows should be left open day and night for as many days as possible. And then again—if in Summer with dust and insects flying around—another general cleaning and washing of the room the day pre-

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vious to the operation. On the evening before the day of the operation, the operating and other tables, chairs, bowls, pitchers, pails, should be brought into the room—everything plain, wooden or earthen, and scrupulously well washed with warm water, soap and brush in all cracks and corners—and, furthermore, the newly washed sheets, blankets, the oil-cloth for dressing the operating-table (no pillow!), the towels, the clothes to change on the patient after the operation, all the dressing material—in its packings—the instrument-trays, sponges, jars, the bottles containing the antiseptic solution—in short, everything which the operator or his assistants might have to or happen to lay their hands on during the operation, except the instruments and the patient.

As stated, everything ought to be most thoroughly cleansed before being brought in. The sheets, blankets, towels, operating gowns for the doctor and his assistants and all similar things ought to be unfolded and hung on chairs or lines in order that the coming final disinfection may reach every part of them.

For this final disinfection of the room and its contents, one of the most efficacious, as well as an extremely simple proceeding, is fumigation with sulphurous acid gas, which is performed in the following way:

All the windows and doors in the room are diligently closed, and one of the windows arranged in such a manner that it may be opened from the outside in order to let the gas out before people enter the room. The room is measured and about one ounce of sulphur is used to each cubic yard in the room. The sulphur is crushed into small pieces and mixed with a few, wooden flinders placed in a small sheet-iron cup, which, to prevent danger of fire is placed in a larger pan filled with sand. It is lighted the evening before the operation, and the room remains closed until the following morning when, the window is first opened and afterwards, when the most of the gas has escaped, the room may be entered.

This manner of disinfecting a room has been found more efficacious than, for instance, the use of chlorine gas, and is to-day the best generally available method known.

Next comes the preparation of the patient. For a week or

so preceding the operation, the patient, if circumstances will allow, ought to be bathed with soap and water repeatedly. Especially is this desirable when the patient belongs to that class of people in which cleanliness is not considered to be one of the more important virtues. If he cannot be given a bath he should be washed and brushed all over, especial attention being given to the field of operation, the hair and beard, the armpits, pubes and feet. After each such cleansing his linen and bed-sheets ought to be changed. All this, it must be remembered, to be varied more or less, according to the kind and magnitude of the operation and the time which may be available.

In all cases the patient should be bathed and his underwear and bed-sheets changed on the evening previous to the operation. And in this same attire he is, on the next morning, to be anæsthetized and put on the operating-table.

Here the field of operation—that is, every part which must be left uncovered during the operation or which after the operation will be covered by the dressing—is shaved (or this may conveniently have been done the evening before), thoroughly soaped and brushed and dried and then sponged off with a strong antiseptic solution, or still better, for fifteen or twenty minutes covered with a compress formed by a folded towel soaked in a 1 or 2 *pro-mille* corrosive sublimate solution, which is considered a perfectly reliable germicide to the parts which it touches when it is brought into contact with them for the space of time mentioned. A further precaution, especially in localities where sebaceous glands abound, is to bathe the operating field with ether, benzine or spirits of turpentine in order to remove the sebum, which may contain micro-organisms protected by it from the action of aqueous antiseptic solutions. It is also desirable to disinfect in a similar way one of the patient's wrists in order that the operator may, at any time, be able to observe the patient's pulse without contaminating his fingers. If the assistant giving the anæsthetic wishes to watch the pulse also, he must make use of the other wrist.

Parts of the body or extremities neighboring to the field of operation, so that the hands of the operator or his nearest

assistants might be apt to fall upon them should be thoroughly covered and enveloped in sheets or towels, either simply disinfected with the room, or, when deemed prudent, wrung out in and during the operation repeatedly sprinkled with some antiseptic solution. In operating on the extremities the last proceeding seems to be the best, but in most cases I would hesitate to place such a wet compress for any length of time around a patient's abdomen, chest or neck, being afraid that the great loss of body heat, caused by the evaporation from so large a surface, might contribute to a dangerous extent towards collapse together with the other concomitants of a large operation—the anæsthesia, the loss of blood and the shock.

When the operation is to be performed in the vicinity of one of the natural openings, some special precaution must be taken to prevent, if possible, an accidental soiling with urine, fæces, saliva or vomited material, and it must be conceded that a satisfactory antiseptics, in those localities, is very often beyond reach. In operations on the neck, where the hair cannot be cut short and thoroughly disinfected, as for instance, when removing tuberculous glands from young lady patients, the hair, after being washed and disinfected as thoroughly as possible, ought to be completely covered and secured in a cap or towel, which, during the operation, is kept impregnated with some strong antiseptic solution. This is necessary, because, under this and similar operations, the operator himself will unavoidably have to handle the head, move it in different positions, etc.

The patient having thus been made ready, how should the operator and his different assistants prepare themselves?

The ideal aseptic operator would very likely be a man who stepped into the operating-room directly from a Russian or Roman bath, simply dressed in a disinfected operating-gown and with a pair of sandals on his bare feet. And it would hardly be surprising if something like that was proposed and executed in the near future by some logical, consistent, antiseptic enthusiast, in some new hospital. But in the circumstances kept in view by this paper, much less will have to suffice.

Every practitioner who is occasionally occupied with surgery ought to keep a constant eye or rather thought on his clothing, and mentally note what clothing he wore when he happened to be called to a case of diphtheria, erysipelas, pyæmia, puerperal fever, or scarlet fever or when he made a post-mortem examination. In clothing worn on such occasions, he should not go to an important surgical operation or to a surgical dressing, unless a good long time had elapsed, and the clothes had been beaten and brushed and hung out in the fresh air and sun-light for several whole days. It must always be remembered what powerful germicides we have in the moving fresh air and in the sun-light. Most micro-organisms thrive the best in darkness, moisture and close air, like the fungi in cellars.

Before entering the operating-room the surgeon should remove his coat and vest, his underclothing, of course, being clean, and thoroughly wash his head, face and hands, paying especial attention to his hair and beard. Furthermore it can hardly be considered consistent with good anti-sepsis for an operator or his assistants to walk into the operating-room in the shoes which they have been wearing on the streets and in the yards immediately previous. A pair of house-slippers would practically meet the requirements.

To take a general bath immediately previous to the operation is something which I might insist upon for some of my assistants, *outside* (the nurse for instance), and occasionally, *inside*, of the profession. But for a man with regular cleanly habits any special preparation of that kind is hardly necessary.

After this preliminary preparation the operator (or some of his trusted assistants), proceeds with the cleansing of the field of operation and other preparation of the patient. After this is done he finally disinfects his hands and puts on the operating gown. The hands and fore-arms should be again thoroughly washed with soap and water, using a stiff brush freely, paying particular attention to the folds and creases of the fingers and under the nails. The hands are then dried off on a disinfected towel and, immediately before the commencement of the operation, washed in a 1 or 2 *pro-mille* corrosive

sublimate solution or in spirits of turpentine. Afterward also, in the course of the operation, the operator and his first assistants ought occasionally to dip their hands into some antiseptic solution—conveniently the sponge bowl—and especially before going deeper into the wound, or, for instance, the abdominal cavity, with an exploring or operating finger.

The disinfected operating-gown is made of white cotton or muslin, not too thin, long enough to cover the person almost to the feet, with the front whole, and buttoned or tied behind, and best provided with a continuous cap to cover the hair. The sleeves are to be folded back and tied above the elbows. The gown is provided with an outside pocket for the handkerchief, which must be fresh from the laundry, and which should not be used at all during the operation if possible to avoid it.

It may not be superfluous here to mention, that all those employed at an operation ought previously to have accomplished their *functiones naturales* in way of defæcation and micturition, as a cogent desire in that direction will at least make the operator nervous and hasty. For him to interrupt an operation, or for an assistant to leave the room in order to satisfy these functions, must be considered inadmissible.

During the operation the operator and his nearest assistants must remember that to cough, sneeze, laugh, or even to talk much while bending over the wound is inconsistent with good antisepsis. It has been found on investigation that the ordinary expired air contains surprisingly few, and presumably rather innocuous micro-organisms, but under more forcible expiratory action particles of saliva or mucus from the mouth and nose, are apt to be carried off, and they are full of noxious organisms. Furthermore, great caution should be exercised against such thoughtless acts, as, in attempting to thread a needle, biting the end of the thread, or smoothing it between the lips, or putting an instrument in the mouth for temporary safe-keeping.

Of the assistants only those assisting in the wound or handling the instruments, ligatures and sponges are supposed to be perfectly aseptic, dressed in operating-gowns and being very careful about permitting their hands to come in contact with anything impure—as for instance inserting the hand under the

operating-gown into a pocket and to leave watches, door-knobs, windows and uncovered furniture alone. The anæsthetist and his assistants, which he ought to have in every operation, of long duration, whose duty is to help hold the patient in position, the nurse bringing hot and cold water and the spectators, do not need operating-gowns, and are not supposed to be perfectly aseptic about their hands, but should otherwise have taken all due precautions in the way of cleanliness, and should keep themselves as much at a distance as consistent with their functions.

With regard to assistants in the wound every operator should emancipate himself from their aid as much as practicable and himself do as much of the sponging, retracting, ligating and other handling of the wound as possible without retarding the operation. It is plain that the danger of infection, notwithstanding all preventive measures, increases in direct proportion to every new hand or finger which goes into the wound, and it is believed that surgeons generally will find upon trial that most of the conventional assistance of this kind can be readily dispensed with.

Until lately surgical antisepsis had chiefly to do with the preparing of instruments, sponges, ligatures, sutures and dressing material, while the measures here touched upon were more or less overlooked. Therefore the different methods of preparing these articles are better known and more generally practiced, so that a discussion of them may properly be omitted.